

(6) If the in-use torque is not within 2 percent of the master torque, adjust or repair the system. Repeat steps in paragraphs (c)(2) through (c)(5) of this section with the adjusted or repaired system.

(d) Calibrated resistors may not be used for engine flywheel torque transducer calibration, but may be used to span the transducer prior to engine testing.

(e) Perform other engine dynamometer system calibrations as dictated by good engineering practice.

[59 FR 31335, June 17, 1994. Redesignated and amended at 63 FR 56995, 57010, Oct. 23, 1998]

§ 89.308 Sampling system requirements for gaseous emissions.

(a) For each component (pump, sample line section, filters, and so forth) in the heated portion of the sampling system that has a separate source of power or heating element, use engineering judgment to locate the coolest portion of that component and monitor the temperature at that location. If several components are within an oven, then only the surface temperature of the component with the largest thermal mass and the oven temperature need be measured.

(b) If water is removed by condensation, the sample gas temperature shall be monitored within the water trap or the sample dewpoint shall be monitored downstream. In either case, the indicated temperature shall not exceed 7 °C.

[59 FR 31335, June 17, 1994. Redesignated and amended at 63 FR 56995, 57010, Oct. 23, 1998]

§ 89.309 Analyzers required for gaseous emissions.

(a) *Analyzers.* The following instruments are required for analyzing the measured gases:

(1) *Carbon Monoxide (CO) analysis.* (i) The carbon monoxide analyzer must be of the non-dispersive infrared (NDIR) absorption type.

(ii) The use of linearizing circuits is permitted.

(2) *Carbon Dioxide (CO₂) analysis.* (i) The carbon dioxide analyzer must be of the non-dispersive infrared (NDIR) absorption type.

(ii) The use of linearizing circuits is permitted.

(3) [Reserved]

(4) *Hydrocarbon (HC) analysis.* (i) The hydrocarbon analyzer must be of the heated flame ionization (HFID) type.

(ii) If the temperature of the exhaust gas at the sample probe is below 190 °C, the temperature of the valves, pipework, and so forth, must be controlled so as to maintain a wall temperature of 190 °C ±11 °C. If the temperature of the exhaust gas at the sample probe is above 190 °C, the temperature of the valves, pipework, and so forth, must be controlled so as to maintain a wall temperature greater than 180 °C.

(iii) The FID oven must be capable of maintaining temperature within 5.5 °C of the set point.

(iv) Fuel and burner air must conform to the specifications in § 89.312.

(v) The percent of oxygen interference must be less than 3 percent, as specified in § 89.319(d).

(5) *Oxides of nitrogen (NO_x) analysis.* (i) This analysis device must consist of the subsequent items, following the sample probe, in the given order:

(A) Pipework, valves, and so forth, controlled so as to maintain a wall temperature above 60 °C.

(B) A NO₂ to NO converter. The NO₂ to NO converter efficiency must be at least 90 percent.

(C) For raw analysis, an ice bath or other cooling device located after the NO_x converter (optional for dilute analysis).

(D) A chemiluminescent detector (CLD or HCLD).

(ii) The quench interference must be less than 3.0 percent as measured in § 89.318.

(b) Other gas analyzers yielding equivalent results may be used with advance approval of the Administrator.

(c) The following requirements must be incorporated in each system used for testing under this subpart.

(1) Carbon monoxide and carbon dioxide measurements must be made on a dry basis (for raw exhaust measurement only). Specific requirements for the means of drying the sample can be found in § 89.309(e).

(2) Calibration or span gases for the NO_x measurement system must pass through the NO₂ to NO converter.

(d) The electromagnetic compatibility (EMC) of the equipment must be